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Wei Li

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HICKMAN PALERMO TRUONG & BECKER/ORACLE

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EXAMINER

AHN, SANGWOO

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/643,563	<b>Applicant(s)</b> LI ET AL.	
	<b>Examiner</b> Sangwoo Ahn	<b>Art Unit</b> 2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 23-29 and 37-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-29, 37-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

1. Claims 23 – 29 and 37 – 39 are pending in this Office Action.  
Claims 1 – 22 and 30 – 36 have been canceled.  
No claims have been amended.

### *Response to Arguments*

2. Applicant's arguments with respect to 35 USC 101 rejections have been fully considered and are persuasive. The 35 USC 101 rejections of claims 23 – 29 and 37 – 39 have been withdrawn.
3. Applicant's arguments with respect to claims 23 and 37 have been fully considered but they are not persuasive.

Applicant mainly argued:

1. Agrawal lacks any teaching or suggestion of anything analogous to generating cost estimates for each of a plurality of available occurrence counting techniques based on an estimated I/O cost of using the available occurrence counting technique."
2. Agrawal lacks any teaching or suggestion of considering conditions existing in a computing environment in which the frequent itemset operation is to be performed. Moreover, claim 37 specifies what those conditions include, namely that the conditions include one or more of (a) workload of a computer system executing the frequent itemset operation, and (b) resources available on said computer system.

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Examiner respectfully traverses the arguments for the following reasons:

From the Examiner's understanding, the main point of the Applicant's arguments is that the cost estimation in claims 23 and 37 is based on I/O cost or conditions existing in the computing environment, which may include workload and resources available on the computer system. First, I/O normally refers to transferring data, so the I/O cost can be interpreted as the cost of transferring data. Second, workload of a computer system and resources available on a computer system are all related to the amount of data and data activity within the system. The cost estimation in Agrawal is based on a number of data characteristics like the number of items, total number of transactions, average length of a transaction, etc. These parameters suggest that the cost estimation is essentially based on how much data is being transferred (number of transactions), workload (number of transactions, average length of transactions) and resources available (the more the number of items or transactions, the less the available resources). The recited conditions on which the cost estimation is based are well known in the data processing art to be the purpose of "cost estimation" within the computing environment, which is to lessen the workload and to increase the available resources.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 28 recites the limitation "said at least one phase" in line 2, "said phase" in line 4, "the phase" in line 7. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 23, 29 and 37 – 39 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Number 6,324,533 issued to Rakesh Agrawal et al. (hereinafter "Agrawal").

Regarding claim 23, Agrawal discloses,

A method comprising performing a machine-executable operating involving instructions, wherein the machine-executed operation is at least one of:

- A) sending said instructions over transmission media;
- B) receiving said instructions over transmission media;
- C) storing said instructions onto a machine-readable storage medium; and
- D) executing the instructions;

wherein said instructions are instructions which, when executed by one or more processors, cause the performance of a frequent itemset operation by performing the steps of:

dynamically selecting which occurrence counting technique to use from a plurality of available occurrence counting techniques (C3:L19-21, et seq.) by performing the steps of:

generating cost estimates for each of the plurality of available occurrences counting techniques based on an estimated I/O cost of using the available occurrence counting technique (C12:L34-37, et seq.); and

selecting the occurrence counting technique that has the lowest estimated cost; and

during said frequent itemset operation, using said selected occurrence counting technique to count occurrences of at least one combination to determine whether said at least one combination satisfies frequency criteria associated with said frequent itemset operation (C3:L23-24, et seq.).

Regarding claim 29, Agrawal discloses determining that a particular occurrence counting technique will not be considered during any phase of the frequent itemset operation, and performing the frequent itemset operation without performing startup operations for said particular occurrence counting technique (C11:L40-44, et seq.).

Regarding claim 37, Agrawal discloses,

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A method comprising performing a machine-executable operating involving instructions, wherein the machine-executed operation is at least one of:

- A) sending said instructions over transmission media;
- B) receiving said instructions over transmission media;
- C) storing said instructions onto a machine-readable storage medium; and
- D) executing the instructions;

wherein said instructions are instructions which, when executed by one or more processors, cause the performance of a frequent itemset operation by performing the steps of:

dynamically selecting which occurrence counting technique to use from a

plurality of available occurrence counting techniques based on

conditions existing in a computing environment in which the

frequent itemset operation is to be performed (C12:L21-32, et seq.),

wherein the conditions include one or more of (a) workload of a

computer system executing the frequent itemset operation,

and (b) resources available on said computer system

(C11:L17-33, et seq.); and

during said frequent itemset operation, using said selected occurrence

counting technique to count occurrences of at least one

combination to determine whether said at least one combination

satisfies frequency criteria associated with said frequent itemset

operation (C3:L23-24, et seq.).

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Regarding claim 38, Agrawal discloses,  
said at least one phase is a phase during which combinations having N items are  
processed (C3:17-19, et seq.);  
a first occurrence counting technique is selected for said phase of said frequent  
itemset operation (C3:L19-21, et seq.);  
the operation includes dynamically selecting a second occurrence counting  
technique in the phase of a subsequent frequent itemset operation during  
which combinations having N items are processed (C3:L17-21; C15:L1-5,  
et seq.); and  
the first occurrence counting technique is different from said second occurrence  
counting technique (C3:L17-24).

Claim 39 is rejected based on the same rationale discussed in claim 29 rejection.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all  
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 24 – 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over  
Agrawal in view of High Performance Mining of Maximal Frequent Itemsets written by  
Gosta Grahne and Janfei Shu (hereinafter "Grahne").



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Regarding claims 24 – 25, Agrawal discloses the method of claim 23.

Agrawal does not explicitly disclose prefix tree technique.

However, Grahne discloses the prefix tree technique in page 2 § 1 Introduction, ¶ 5; page 3, § 2.1 FP-Tree and FP-Growth Method, ¶ 2).

One of ordinary skill in the art at the time of invention would have recognized that the methods disclosed in Grahne comprise the details of a subset of the method taught by Agrawal. It would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal and Grahne because they are both focused on knowledge within the domain of data mining. Specifically, Grahne state on page 10 § 4 ¶ 1 that their “paper studies the performance of algorithms for mining frequent itemsets,” which would clearly be of importance to the frequent itemset mining stage of the association rule mining method of Agrawal. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal and Grahne.

Regarding claim 26 – 27, Agrawal discloses the method of claim 23.

Agrawal does not explicitly disclose bitmap intersection technique.

However, Grahne discloses the bitmap intersection technique in page 2 § 1 Introduction, ¶ 5; page 3, § 2.1 FP-Tree and FP-Growth Method, ¶ 2).

One of ordinary skill in the art at the time of invention would have recognized that the methods disclosed in Grahne comprise the details of a subset of the method taught by Agrawal. It would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal and Grahne because they are

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both focused on knowledge within the domain of data mining. Specifically, Grahne state on page 10 § 4 ¶ 1 that their “paper studies the performance of algorithms for mining frequent itemsets,” which would clearly be of importance to the frequent itemset mining stage of the association rule mining method of Agrawal. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal and Grahne.

Regarding claim 28, Agrawal discloses the method of claim 23.

Agrawal does not explicitly disclose bitmap intersection technique and prefix tree technique.

However, Grahne discloses the bitmap intersection technique and the prefix tree technique in page 2 § 1 Introduction, ¶ 5; page 3, § 2.1 FP-Tree and FP-Growth Method, ¶ 2).

One of ordinary skill in the art at the time of invention would have recognized that the methods disclosed in Grahne comprise the details of a subset of the method taught by Agrawal. It would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal and Grahne because they are both focused on knowledge within the domain of data mining. Specifically, Grahne state on page 10 § 4 ¶ 1 that their “paper studies the performance of algorithms for mining frequent itemsets,” which would clearly be of importance to the frequent itemset mining stage of the association rule mining method of Agrawal. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal and Grahne.

**Conclusion**

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sangwoo Ahn whose telephone number is (571) 272-5626. The examiner can normally be reached on M-F 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on (571) 272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Patent Examiner Sangwoo Ahn  
AU 2166

10/12/07 SW

  
**HOSAIN ALAM**  
**SUPERVISORY PATENT EXAMINER**